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10/520,988	01/10/2005	Jurgen Weese	PHDE020167US	9474

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS 595 MINER ROAD CLEVELAND, OH 44143		RASHID, DAVID

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _10 January 2005_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-18_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-18_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _10 January 2005_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _1/10/2005_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

All of the examiner's suggestions presented herein below have been assumed for examination

purposes, unless otherwise noted.

Amendments

1.   This office action is responsive to the preliminary claim amendment received on

1/10/2005.

Priority

2.   Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) (Application #

102 31 061.0, 1/10/2005), which papers have been placed of record in the file.

Drawings

3.   The drawings are objected to under 37 CFR 1.83(a) because they fail to show subject

matter as described in the specification. Any structural detail that is essential for a proper

understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). It

is suggested to add "control unit" inside box element 7, "evaluation unit" inside box element 22,

"data processing unit" inside box element 23, "reconstruction unit" inside box element 10, and

"acquisition unit" inside box element 7.

4.   Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to

the Office action to avoid abandonment of the application. Any amended replacement drawing

sheet should include all of the figures appearing on the immediate prior version of the sheet,

even if only one figure is being amended. The figure or figure number of an amended drawing

should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure

must be removed from the replacement sheet, and where necessary, the remaining figures must

be renumbered and appropriate changes made to the brief description of the several views of the

drawings for consistency. Additional replacement sheets may be necessary to show the

renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet"

pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will

be notified and informed of any required corrective action in the next Office action. The

objection to the drawings will not be held in abeyance.

Specification

5.   Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a

separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed

150 words in length since the space provided for the abstract on the computer tape used by the

printer is limited. The form and legal phraseology often used in patent claims, such as "means"

and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist

readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the

title. It should avoid using phrases which can be implied, such as, "The disclosure concerns,"

"The disclosure defined by this invention," "The disclosure describes," etc.

6.   The following guidelines illustrate the preferred layout for the specification of a utility

application. These guidelines are suggested for the applicant's use.

As provided in 37 CFR 1.77(b), the specification of a utility application should include

the following sections in order. Each of the lettered items should appear in upper case, without

underlining or bold type, as a section heading. If no text follows the section heading, the phrase

"Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR
        DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A
        COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
        (1) Field of the Invention.
        (2) Description of Related Art including information disclosed under 37 CFR 1.97
        and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence
        Listing" is required on paper if the application discloses a nucleotide or amino
        acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence
        Listing" is not submitted as an electronic document on compact disc).

Claim Objections

7.   The following is a quotation of 37 CFR 1.75(a):

The specification must conclude with a claim particularly pointing out and distinctly claiming the subject
matter which the applicant regards as his invention or discovery.

8.   **Claims 1 – 18** are objected to under 37 CFR 1.75(a), as failing to conform to particularly

point out and distinctly claim the subject matter which application regards as his invention or

discovery.

(i) Claims 9, 17, and 18 contain acronyms that are not formally introduced (i.e. using the

full phrase of the acronym followed by the acronym itself in parentheses) – it is

suggested to use the format given (e.g. "MR image" to "magnetic resonance (MR)

images")

(ii) Claim 1, line 7, claim 2, line 7, and claim 3, line 7 cite "between the two states of

motion" that lacks antecedent basis as it is unclear when the two states of motion were

performed – suggest changing to "between ~~the~~ two states of motion" or "between the two

states of motion from the two further images"

(iii) Claim 1, line 9 and claim 3, line 9 cite "…at least approximately…" and "…at least

substantially…" but it is unclear to what degree the intermediate image representing the

object had performed the motion – it is suggested to change to "…~~at least~~

~~approximately~~…" and "…~~at least substantially~~…"

(iii) Claim 6, line 2 cites "registered, notably elastically registered,…" but it is unclear

whether the images are registered or elastically registered – suggest changing to

"elastically registered~~, notably elastically registered,~~…"

(iv) Claim 1, line 1, claim 2, line 1, and claim 3, line 1 cite "…enhancing the information

contents…" but it is unclear as to what exactly is having its information contents

enhanced.

(v) Claim 11, line 1 cites "[a]n examination apparatus, notably a medical examination apparatus" but is it unclear whether it is a medical examination apparatus or not – suggest changing to "[a]n examination apparatus, notably a medical examination apparatus"

(vi) Claim 11, lines 3 and 5 cite "and/or" but it is unclear whether it is AND or OR – suggest changing to "and/or or" for the broadest scope

(vii) Claims, 9, 17, 18 cite "wherein the image is a PET..." but it is unclear what image is being considered – suggest changing to "wherein the first image is a PET..."

(viii) Claim 4, line 3 cites ", possibly by means of registration" but it is unclear if it is in fact by means of registration or not – suggest deleting the phrase altogether or incorporating (", possibly by means of registration") as assumed for examination purposes

(ix) Claim 15, line 1 cites "the intermediate image" that lacks antecedent basis

(x) Claim 5, 15, 16 cite ", the images thus formed being weighted" but it is unclear what image is being weighted – suggest changing to ", the first images thus formed being weighted"

9.   **Claim 7** is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form. Claim 7 cites "wherein the combination image is focused in a further step" but the combination image would already have to be focused in another step.

Claim Rejections - 35 USC § 102

10.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

11.   **Claims 1 – 5, 7,** and **10 – 16** are rejected under 35 U.S.C. 102(b) as being anticipated by

Bani-Hashemi et al. (US 5,690,106 A).

Regarding **claim 1**, Bani-Hashemi discloses a method of enhancing the information

contents which can be derived from a first image ("contrast data" in Col. 8, lines 38 – 40),

containing motion artifacts (the object in both the contrast stack and mask stack contain motion

artifacts), of a moving object (the object in FIG. 2), which method includes the following steps:

a.   using two further images ("CONTRAST SEQUENCE" and "MASK SEQUENCE" in

FIG. 3) which represent the object in a respective state of motion with as few motion artifacts as

possible (the two image sequences are "with as few motion artifacts as possible" as this is

relative, they have few motion artifacts as possible when the machine in FIG. 1 attempts

"identical angles for corresponding images in the mask and contrast runs" (Col. 4, lines 25 –

26)),

b.   determining a motion model ("W^n" in FIG. 3; FIG. 4, element 5) which characterizes

states of motion assumed by the object while performing the motion between the two states of

motion (interpolating the contrast and mask sequence is characterizing a state of motion assumed

by the object while performing the motion between the two states of motion),

c.   forming an intermediate image of the object (FIG. 4, element 6 wherein the geometrically

corrected mask data is the intermediate image) from the motion model and the two further

images (the geometrically corrected mask data is ultimately derived from the interpolation and

sequences), the intermediate image representing the object as if it had performed the motion (the

geometrically corrected mask data represents the object as if it had performed the motion when

updating the mask data),

d.   forming a combination image (the resulting image in subtracting the geometrically

corrected mask data from the contrast data is itself the combination image as subtraction is a

form of "combination") from the intermediate image (FIG. 4, element 6 wherein the

geometrically corrected mask data is the intermediate image) and the first image ("contrast data"

in Col. 8, lines 38 – 40).

        Regarding **claim 2**, Bani-Hashemi discloses a method of enhancing the information

contents which can be derived from a first image ("contrast data" in Col. 8, lines 38 – 40),

containing motion artifacts (the object in both the contrast stack and mask stack contain motion

artifacts), of a moving object (the object in FIG. 2), which method includes the following steps:

a.   using two further images ("CONTRAST SEQUENCE" and "MASK SEQUENCE" in

FIG. 3) which represent the object in a respective state of motion with as few motion artifacts as

possible (the two image sequences are "with as few motion artifacts as possible" as this is

relative, they have few motion artifacts as possible when the machine in FIG. 1 attempts

"identical angles for corresponding images in the mask and contrast runs" (Col. 4, lines 25 –

26)),

b.   determining a motion model ("W^n" in FIG. 3; FIG. 4, element 5) which characterizes

states of motion assumed by the object while performing the motion between the two states of

motion (interpolating the contrast and mask sequence is characterizing a state of motion assumed

by the object while performing the motion between the two states of motion),

c.   focusing (focus is defined as the concentration of attention or energy on something and in

this case, the concentration of attention or energy on the first image by means of the motion

model; the subtraction step between the geometrically corrected mask data and contrast data is

"focusing" on the contrast data) the first image ("contrast data" in Col. 8, lines 38 – 40) by

means of the motion model ("W^n" in FIG. 3; FIG. 4, element 5).

Regarding **claim 3**, Bani-Hashemi discloses a method of enhancing the information

contents which can be derived from a first image ("contrast data" in Col. 8, lines 38 – 40), to be

reconstructed from projections and containing motion artifacts (the object in both the contrast

stack and mask stack contain motion artifacts), of a moving object (the object in FIG. 2), which

method includes the following steps:

a.   using two further images ("CONTRAST SEQUENCE" and "MASK SEQUENCE" in

FIG. 3) which represent the object in a respective state of motion with as few motion artifacts as

possible (the two image sequences are "with as few motion artifacts as possible" as this is

relative, they have few motion artifacts as possible when the machine in FIG. 1 attempts

"identical angles for corresponding images in the mask and contrast runs" (Col. 4, lines 25 –

26)),

b.   determining a motion model ("W^n" in FIG. 3; FIG. 4, element 5) which characterizes

states of motion assumed by the object while performing the motion between the two states of

motion (interpolating the contrast and mask sequence is characterizing a state of motion assumed

by the object while performing the motion between the two states of motion),

c.   forming an intermediate image of the object (FIG. 4, element 6 wherein the geometrically

corrected mask data is the intermediate image) from the motion model and the two further

images (the geometrically corrected mask data is ultimately derived from the interpolation and

sequences), the intermediate image representing the object as if it had performed the motion (the

geometrically corrected mask data represents the object as if it had performed the motion when

updating the mask data),

d.   reconstructing (the subtraction of the geometrically corrected mask data from the contrast

data is "reconstructing" the contrast data) the first image ("contrast data" in Col. 8, lines 38 – 40)

from the projections of the object (FIG. 2) and the intermediate image (FIG. 4, element 6

wherein the geometrically corrected mask data is the intermediate image).

Regarding **claim 4**, Bani-Hashemi discloses the method as claimed in claim 1, wherein a

respective motion vector field is determined (Col. 8, lines 33 – 34) for parts of the object in order

to determine the motion model.

Regarding **claim 5**, Bani-Hashemi discloses wherein in order to form the intermediate

image (FIG. 4, element 6 wherein the geometrically corrected mask data is the intermediate

image), first images ("contrast data" in Col. 8, lines 38 – 40) of other states of motion of the

object are formed by means of the two further images ("CONTRAST SEQUENCE" and "MASK

SEQUENCE" in FIG. 3) and the motion model ("W^n" in FIG. 3; FIG. 4, element 5), the first

images thus formed being weighted (weighted equally) and subsequently superposed together (being superposed in the subtraction between the contrast data and the mask sequence after the mask sequence has been transformed and interpolated) with the two further images and in conformity with the frequency at which the respective state of motion represented in the images occurs while the motion is performed (Col. 10, lines 41 − 61 in regard to "breathing" creating a frequency of the rib cage).

Regarding **claim 7**, Bani-Hashemi discloses the method as claimed in claim 1, wherein the combination image (the resulting image in subtracting the geometrically corrected mask data from the contrast data is itself the combination image as subtraction is a form of "combination") is focused (focus is defined as the concentration of attention or energy on something and in this case) in a further step (Bani-Hashemi suggests this is done when the combination image is viewed on display 14 of FIG. 1, thus focusing on the combination image).

Regarding **claim 10**, Bani-Hashemi discloses an image processing system (FIG. 1) which includes a data processing unit (FIG. 1, element 14) for carrying out a method as claimed in claim 1 (refer to references/arguments as cited in claim 1).

Regarding **claim 11**, Bani-Hashemi discloses an examination apparatus (FIG. 1), notably a medical examination apparatus, which includes

a device for forming images or projections by means of a first imaging method (the method used to obtain the contrast stack in FIG. 2),

a device for forming images or projections by means of a second imaging method (the method used to obtain the mask stack in FIG. 2),

an image processing system which includes a data processing unit (FIG. 1, element 14) for carrying out a method as claimed in claim 1 (refer to references/arguments as cited in claim 1).

Regarding **claim 12**, Bani-Hashemi discloses a computer readable medium containing instructions for controlling a data processing unit (FIG. 1, element 14) in such a manner that the data processing unit can carry out (it is suggested that the data processing unit 14 "can" carry out the method as it is inherent that the processor must contain instruction for doing so) a method as claimed in claim 1 (refer to references/arguments as cited in claim 1).

Regarding **claim 13**, claim 4 recites identical features as in claim 13. Thus, references/arguments equivalent to those presented above for claim 4 are equally applicable to claim 13.

Regarding **claim 14**, claim 4 recites identical features as in claim 14. Thus, references/arguments equivalent to those presented above for claim 4 are equally applicable to claim 14.

Regarding **claim 15**, claim 5 recites identical features as in claim 15. Thus, references/arguments equivalent to those presented above for claim 5 are equally applicable to claim 15.

Regarding **claim 16**, claim 5 recites identical features as in claim 16. Thus, references/arguments equivalent to those presented above for claim 5 are equally applicable to claim 16.

Claim Rejections - 35 USC § 103

12.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

13.   **Claims 6** and **8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bani-

Hashemi et al. (US 5,690,106 A) in view of Tom et al. (Motion Estimation of Skeletonized

Angiographic Images Using Elastic Registration, IEEE Transactions on Medical Imaging, Vol.

13, No. 3, 11/1994, pp 450 – 460).

Regarding **claim 6**, while Bani-Hashemi discloses the method as claimed in claim 1,

Bani-Hashemi does not teach wherein the intermediate image and the first image are elastically

registered, prior to the formation of the combination image.

Tom teaches wherein images are elastically registered (Abstract; Introduction, p 450).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made for the intermediate image and the first image of Bani-Hashemi to be elastically

registered as taught by Tom "in order to estimate the motion of the corresponding arteries", Tom,

Abstract and that it "is very successful especially with low contrast and noisy angiographic

images", Tom, Abstract.

Regarding **claim 8**, claims 1 and 6 recite identical features as in claim 8. Thus,

references/arguments equivalent to those presented above for claims 1 and 6 are equally

applicable to claim 8.

14.   **Claims 9** and **17 – 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Bani-Hashemi et al. (US 5,690,106 A) in view of Levin (US 5,546,472 A).

Regarding **claim 9**, while Bani-Hashemi discloses the method as claimed in claim 1,

wherein the first image is a CT image (Col. 4, line 66 – Col. 5, line 4 suggests CT use) and the

two further images are one of CT images (Col. 4, line 66 – Col. 5, line 4 suggests CT use) and

MR images, Bani-Hashemi does not teach wherein the first image is a PET image or a SPECT

image.

Levis discloses a feature guided method for obtaining an image of an object (FIG. 1A)

that teaches wherein the imaging system may be a CT, PET, SPECT, or other imager (Col. 17,

lines 6 – 11).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made for the first image of Bani-Hashemi to be selected from CT, PET, SPECT, or other

imager as taught as by Levin "to provide a method and apparatus which employs feature

recognition imaging which determines how to scan and reconstruct images of other similar

subjects without incorrect guesswork or free parameters.", Levin, Col. 2, line 66 – Col. 3, line 3.

Regarding **claim 17**, claim 9 recites identical features as in claim 17. Thus,

references/arguments equivalent to those presented above for claim 9 are equally applicable to

claim 17.

Regarding **claim 18**, claim 9 recites identical features as in claim 18. Thus,

references/arguments equivalent to those presented above for claim 9 are equally applicable to

claim 18.

Conclusion

15.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to David P. Rashid whose telephone number is (571) 270-1578.

The examiner can normally be reached Monday - Friday 8:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

David P Rashid
Examiner
Art Unit 2624

VIKKRAM BALI
PRIMARY EXAMINER